2,4- and 2,6-DINITROTOULENE

What are 2,4- and 2,6-DINITROTOLUENE?

Both 2,4-dinitrotoulene (2,4-DNT) and 2,6-dinitrotoluene (2,6-DNT) are man-made solids that are pale yellow and have a slight odor. They are two of the six forms of a chemical called dinitrotoluene (DNT). DNT is made by mixing toluene with nitric acid.

Where can 2,4- and 2,6-DNT be found and how are they used?

DNT can be found in air, surface water, groundwater and soil. It is sent into the air in the form of dusts or aerosols from factories. An aerosol is a small particle suspended in the air. It is unlikely that DNT would go into the air as a vapor from water. It is believed that when the chemicals are exposed to sunlight, DNT breaks down in air through different chemical reactions.

DNT is used to make bedding and furniture foam, ammunition, explosives, dyes and as a propellant in air bags for cars.

How can people be exposed to 2,4- and 2,6-DNT?

You could be exposed to 2,4- and 2,6-DNT through:

Breathing air near waste sites or factories that release DNT. You could also breathe DNT if you work where it is used or made.

Drinking water polluted with DNT. This could happen if you live near a waste site containing DNT. You could also be exposed through ground water that is near a factory where DNT may be released.

Touching soil at a waste site, or touching materials at work that have been in contact with DNT.

Eye Contact by touching the eyes with hands that have been in contact with DNT. You could also splash it, or get vapors into your eyes.

Most people are not likely to be exposed to DNT. There are low levels of DNT in the environment.

How do 2,4- and 2,6-DNT work?

At work, the main way these chemicals enter the body is by breathing or touching it. It may also enter the body by mouth. This could happen if you touch DNT, then eat or smoke without washing your hands. When DNT enters the body, the liver and intestines change it into different substances. Most of these chemicals leave the body in 24 hours through the urine and waste matter.

How can 2,4- and 2,6-DNT affect my health?

Scientists have seen an increased death rate from heart disease in workers exposed to 2,4-DNT or technical grade DNT (Tg-DNT). However, these workers may also have been exposed to other chemicals. 2,4- and 2,6-DNT may affect the nervous system and the blood. One study showed that male workers exposed to 2,4- and 2,6-DNT had reduced levels of sperm but later studies did not confirm the finding.

Exposure to high levels of these compounds in animals causes reproductive problems. These include lower sperm counts and reduced fertility. Animal studies have also shown other effects. These include damage to the nervous system, liver and kidneys. Red blood cell counts can also be reduced. Both 2,4- and 2,6-DNT can cause liver cancer in laboratory rats. It is possible that 2,4- and 2,6-DNT may cause cancer in humans.

How is 2,4- and 2,6-DNT poisoning treated?

There is no treatment just for DNT. Treatment depends on the level of exposure.

What should I do if exposed to 2,4- and 2,6-DNT?

If you breathe DNT, move to fresh air. Get medical help.

If you get DNT on your skin, take off contaminated clothes. Wash with lots of soapy water. Cover the skin with an antibacterial cream. Get medical help.

If you get DNT in your eyes, remove contact lenses if you can do it easily. Wash your eyes with clean water for at least 15 minutes. Get medical help.

What factors limit use or exposure to 2,4- and 2,6-DNT?

If you live near a site that could be polluted with DNT, don't let children put dirt, water or other things in their mouths. Make sure they wash their hands often, especially before eating.

Is there a medical test to show whether I've been exposed to 2,4- and 2,6-DNT?

Tests can show 2,4- and 2,6-DNT in the blood and urine. These tests cannot show the amount of exposure to 2,4- or 2,6-DNT. The urine must be collected within 24 hours of exposure.

Technical information for 2,4- and 2,6-DNT

CAS Number: 2,4-DNT – 121-14-2 2,6-DNT – 606-20-2

Chemical Formula: $C_7H_6N_2O_4$

Carcinogenicity (EPA): The mixture of 2,4- and 2,6-DNT has been identified as a probable human carcinogen. There are no assessments for the compounds separately.

MCL (Drinking Water): There is no MCL for DNT.

OSHA Standards: The PEL standard which is based on an 8 hour day, 40 hour week is 1.5 milligrams per cubic meter of air.

NIOSH Standards: The recommended 10 hour Time Weighted Average is 1.5 milligrams per cubic meter of air.

References and Sources

Agency for Toxic Substances and Disease Registry (ATSDR). 1998. *Toxicological profile for 2,4-and 2,6-dinitrotoluene.* Atlanta, GA: U.S. Department of Health and Human Services.

http://www.ilo.org/public/english/protection/safework/cis/products/icsc/dtasht/_icsc07/icsc0729.htm

http://risk.lsd.ornl.gov/tox/profiles/2_6_dinitrotoluene_f_V1.shtml#t44